ALGEBRA

C – 12

114. If $(54\sqrt{2}x^3 + 24\sqrt{3}y^3) \div (\sqrt{18}x + \sqrt{12}y)(Ax^2 + By^2 + Cxy)$, then what is the value of $A^2 - (B^2 + C^2)$ = ?

(A) 24
(B) 12
(C) -24
(D) -36 ✓

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$$\frac{(3\sqrt{2}x)^3 + (2\sqrt{3}y)^3}{(\sqrt{18}x + \sqrt{12}y)(Ax^2 + By^2 + Cxy)}$$

$$\frac{(3\sqrt{2}x + 2\sqrt{3}y)(18x^2 + 6\sqrt{6}xy + 12y^2)}{(3\sqrt{2}x + 2\sqrt{3}y)(Ax^2 + By^2 + Cxy)}$$

$\Rightarrow$ $A = 18$, $B = 12$, $C = 6\sqrt{6}$

$(3\sqrt{2}x)^3 + (2\sqrt{3}y)^3$

$324 - (144 + 216)$

$= 324 - 360$

$= -36$

117. *If* $8(x+y)^3 - 27(x-y)^3 = (5y-x)(Ax^2+By^2+Cxy)$, *then what is the value of* $(A+B-C)$?

(A) 16

(B) -26

(C) 36

(D) -16

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$A = 19$
$B = 7$
$C = -10$

$26 - (-10)$
$= 26 + 10$
$= 36$

$(2x+2y)^3 - (3x-3y)^3$

$= (2x+2y-3x+3y)[(2x+2y)^2 + (2x+2y)(3x-3y) + (3x-3y)^2]$

$= (5y-x)[4x^2 + 8xy + 4y^2 + 6x^2 + 6xy - 6xy - 6y^2 + 9x^2 - 18xy + 9y^2]$

$= (5y-x)[19x^2 + 7y^2 - 10xy]$

$\rightarrow (5y-x)(Ax^2 + By^2 + Cxy)$

117. *If* $8(x+y)^3 - 27(x-y)^3 = (5y - x)(Ax^2 + By^2 + Cxy)$, *then what is the value of* $(A + B - C)$?

(A) 16

(B) -26

(C) 36

(D) -16

SSC CGL 2021

$(2x+2y)^3 - (3x-3y)^3$

$(5y-x)\{(2x+2y)^2 + (2x+2y)(3x-3y) + (3x-3y)^2\}$

$A(x^2) \to 19x^2$

$B(y^2) \to 7y^2$

$C(xy) \to -10xy$

$A = 19$

$B = 7$

$C = -10$

118. If $8(x+y)^3 - (x-y)^3 = (x+3y)(Ax^2 + Cy^2 + Bxy)$, then the value of $(A - B - C)$ is :

(A) -2
(B) -6
(C) 10
(D) 14

SSC CHSL 2019

$A = 7$

$C = 3$

$B = 6$

-2

$(2x+2y)^3 - (x-y)^3$

$(2x+2y)^2 + (2x+2y)(x-y) + (x-y)^2$

$7x^2 + 3y^2 + 6xy$

$Ax^2 + Cy^2 + Bxy$

$$a^3+b^3+c^3-3abc=(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$$

119. *If $a = 5, b = 4, c = 8$ then find the value of*

$$\frac{(a^3 + b^3 + c^3 - 3abc)}{(ab + bc + ca - a^2 - b^2 - c^2)}$$

(A) 15
(B) 17
(C) -17
(D) -15

RRB NTPC 2016

$$\frac{(a+b+c)(a^2+b^2+c^2-ab-bc-ca)}{-(a^2+b^2+c^2-ab-bc-ca)}$$

$= -(a+b+c)$

$= -17$

120. *Find the product of* $(a + b + 2c)(a^2 + b^2 + 4c^2 - ab - 2bc - 2ca)$

(A) $a^3 + b^3 + 8c^3 - 6abc$

(B) $a^3 + b^3 + 8c^3 - 2abc$

(C) $a^3 + b^3 + 8c^3 - abc$

(D) $a^3 + b^3 + 6c^3 - 6abc$

SSC CGL 2020

$(a+b+2c)(a^2+b^2+4c^2-ab-2bc-2ca)$

$\rightarrow a^3 + b^3 + (2c)^3 - 3 \cdot a \cdot b \cdot 2c$

$= a^3 + b^3 + 8c^3 - 6abc$

121. If $x + y + z = 25, x^3 + y^3 + z^3 = 85$ and $xyz = 20$, then find the value of $x^2 + y^2 + z^2 - xy - yz - zx$.

(A) 2
(B) 1
(C) 4
(D) 3

SSC CHSL 2022

$x^3+y^3+z^3-3xyz=(x+y+z)(x^2+y^2+z^2-xy-yz-zx)$

$\Rightarrow 85-60 = 25 \times x$

$\Rightarrow 25 = 25x$

☆☆

$$a^3+b^3+c^3-3abc=(a+b+c)\left[(a+b+c)^2-3(ab+bc+ca)\right]$$